TracVision® BY KVH INDUSTRIES

TracVision M9

Standard Configuration

TracVision M9 User's Guide

TracVision M9
User's Guide

This user's guide provides all of the basic information you need to operate, set up, and troubleshoot the TracVision M9 satellite TV antenna system. For detailed installation information, please refer to the TracVision M9 Installation Guide.

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If you have any comments regarding this manual, please e-mail them to manuals@kvh.com. Your input is greatly appreciated!

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1. Introduction

This chapter provides a basic overview of this manual and your TracVision system.

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1

Using this Manual

This manual provides complete operation, setup, and troubleshooting information for your TracVision system, as well as wiring diagrams for various TracVision M9 configurations.

Who Should Use This Manual

The **user** should refer to the "Operation" chapter to learn how to operate the system.

The **user**, **installer**, or **servicing technician** should refer to the "Settings" chapter for information on configuring the system and the "Wiring Diagrams" appendix for information on connecting additional receivers.

The **installer** or **servicing technician** should refer to the "Advanced Settings and Functions" appendix for information on advanced setting and operational procedures.

The **user** and/or **servicing technician** should refer to the "Troubleshooting" chapter to help identify the cause of a system problem.

Notifications Used in this Manual

This manual uses the following notification to call attention to important information:

IMPORTANT!

This is an important notice. Be sure to read these carefully to ensure proper operation and configuration of your TracVision system.

NOTE: *Notes contain information about system settings.*

TIP: *Tips contain helpful information, allowing you to get the most out of your TracVision system.*

Typographical Conventions

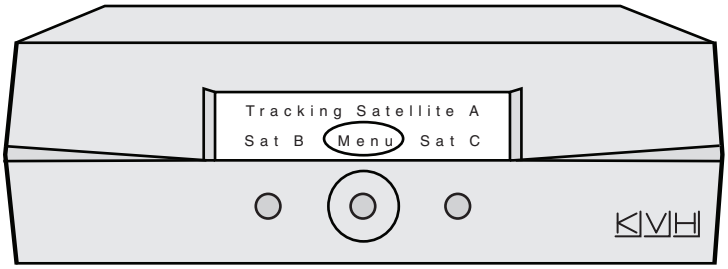
This manual uses the following typographical conventions:

Text Example	Description
`<Sat Name>` `###`	Text in brackets or the pound sign (#) indicates a variable portion of the MCU display
HALT	Bold text in capital letters indicates a command to be entered via a PC
X	Bold text in *italicized* capital letters indicates a variable portion of a command to be entered via a PC

Master Control Unit (MCU) Interface Conventions

When instructions indicate to select a specific MCU menu option, press the MCU button located directly beneath the menu option.

Figure 1-1 Example of MCU Menu Option and Corresponding Button



Related Documentation

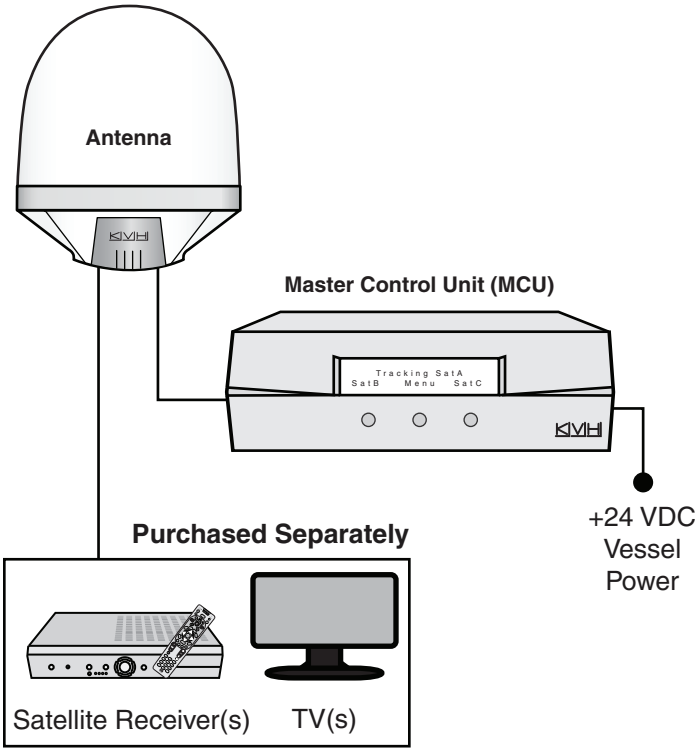
In addition to this User's Guide, the following documents are provided with your TracVision system:

Document	Description
Installation Guide	Complete product installation instructions
Product Registration Form	Details on registering the product
Warranty Statement	Warranty terms and conditions
Contents List	List of every part supplied in the kit

System Overview

Your TracVision system is a state-of-the-art, actively stabilized antenna system that delivers live satellite TV to your vessel's audio/video entertainment system. A basic system is illustrated below. Wiring diagrams are provided in "Appendix C" on page 63.

Figure 1-2 TracVision System Diagram (Basic Installation)



Antenna Unit
The antenna unit houses the antenna positioning mechanism, GPS, LNB (low noise block), and control elements within a radome. Weathertight connectors join the power, signal, and control cabling from the belowdecks units.

MCU
The MCU is the system's user interface, providing access to the system and its functions through an LCD and three buttons. The MCU also serves as the vessel's junction box, allowing the system to use vessel power and supply and receive data to/from the TracVision M9.

System Features

Your TracVision M9 system uses integrated DVB® technology to quickly acquire and track the correct satellite, switch between satellites, and send TV signals to the receiver. The system includes a GPS sensor, ensuring that the system acquires your selected satellite in the shortest time possible.

In-motion Tracking

The TracVision M9 system uses a state-of-the-art actively stabilized antenna system. Once the satellite is acquired, the system's internal gyros continuously measure the heading, pitch, and roll of your vessel and send commands to the antenna motors, keeping the antenna pointed at the satellite at all times - even while you're on the move!

Tri-satellite Tracking Capability

Your TracVision M9 is capable of tracking up to three of your selected satellites, as long as the antenna is located within the selected satellites' coverage area. During installation, your TracVision system should have been set up to track your desired satellites, allowing you to switch between your selected satellites quickly and easily.

Automatic Skew Adjustment (Linear Version Only)

When you change location or switch satellites, the TracVision M9 automatically adjusts the LNB skew for the selected satellite.

Satellite Library

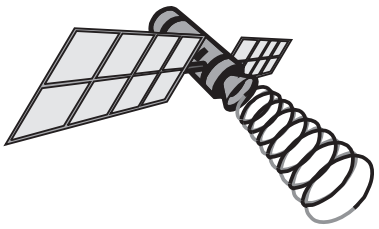
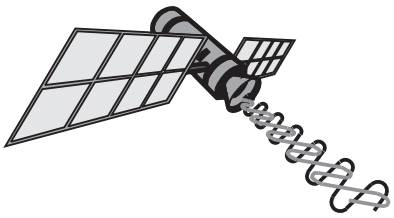
The TracVision M9 includes a library of over 70 of the most popular satellite services in the world! If desired, you can also add up to two more satellites of your choice to the satellite library.

TIP: *For complete information on the satellite library, see* *"Setting the MCU to Track Satellites" on page 19*.

Circular and Linear Versions

Your TracVision system is configured for either circularly polarized satellite signals or linearly polarized satellite signals (see Figure 1-3). Polarization requirements vary according to location and satellite service. For additional details refer to "Setting the MCU to Track Satellites" on page 19.

Figure 1-3 Polarizations of Satellite Signals

Circular	Linear
	
Signals transmitted in two "corkscrew" patterns, one running clockwise and one running counter-clockwise	Signals transmitted in vertical and horizontal "waves" offset exactly 90° from each other

2. Operation

This chapter explains everything you need to know to operate the TracVision system.

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2

Receiving Satellite TV Signals

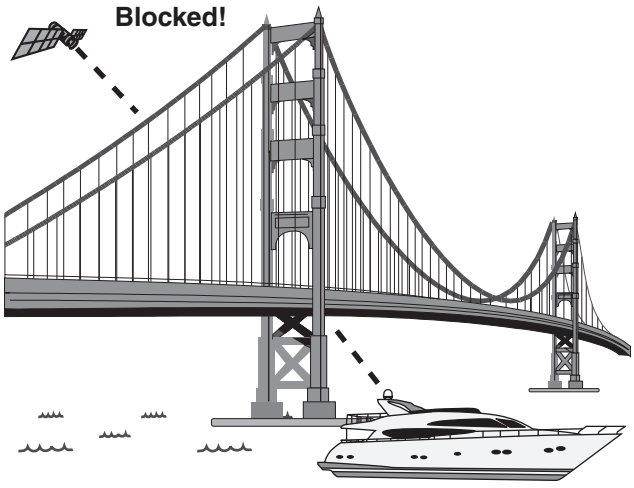
Television satellites are located in fixed positions above the Earth's equator and beam TV signals down to certain regions of the planet (not worldwide). To receive TV signals from a satellite, you must be located within that satellite's unique coverage area.

TIP: *For your convenience, KVH provides links to several web sites that offer satellite coverage information. Simply visit our website at www.kvh.com/footprint or www.satbeams.com.*

Figure 2-1 Location and Coverage Area of DIRECTV 101 Satellite

In addition, since TV satellites are located above the equator, the TracVision antenna must have a clear view of the sky to receive satellite TV signals. Anything that stands between the antenna and the satellite can block the signal, resulting in lost reception. Common causes of blockage include trees, buildings, and bridges. Heavy rain, ice, or snow might also temporarily interrupt satellite signals.

Figure 2-2 Example of Satellite Blockage



Turning the System On/Off

Since power to the antenna is controlled by the MCU, you can turn the antenna on or off by applying/removing power to the MCU.

Turning On the System

Follow the steps below to turn on your TracVision system.

1. Make sure the antenna has a clear view of the sky.
2. Turn on your satellite TV receiver and TV.

IMPORTANT!

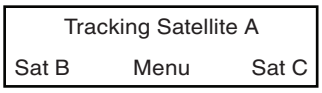
Avoid turning the vessel or changing channels for one minute after turning on the system.

3. Apply operating power to the MCU

TIP: *When operating power is applied to the MCU, the MCU initiates a startup sequence. The screen updates as diagnostic tests are performed.*

4. Wait one minute for system startup. The MCU will display the Tracking Satellite screen after system testing is complete.

Figure 2-3 Tracking Satellite Screen



Turning Off the System

Follow the steps below to turn off your TracVision system.

1. Remove operating power from the MCU.
2. Turn off your satellite TV receiver and TV.

Changing Channels and Switching Between Satellites

During installation, your TracVision system should have been set up to track the satellite(s) of your choice and the channel guides for your selected satellite service should have been downloaded. Your TracVision system is programmed to track two or three satellites, stored in memory as Satellite A, Satellite B, and Satellite C.

IMPORTANT!

(Linear systems only) To ensure proper operation, the receiver(s) must be set up for the same satellites, and in the same order, they are set up in the antenna:

Antenna Satellite	Receiver Satellite	DiSEqC Setting
Sat. A	Alternative 1 or A	DiSEqC 1
Sat. B	Alternative 2 or B	DiSEqC 2
Sat. C	Alternative 3 or C	DiSEqC 3

Since some channels might be located on another satellite, changing channels might require switching to another satellite. Some configurations allow automatic switching between the selected satellites by simply using the primary receiver's remote control. The primary receiver is the receiver connected to the antenna's RF1 connector. The primary receiver controls satellite selection; all other receivers can only receive channels carried on the satellite selected by the primary receiver.

Special Cases

- TracVision M9 configurations with a multiswitch installed require using the MCU to change satellites.

- DISH 1000 customers with the DISH 129 satellite installed must have a multiswitch installed to enable manual switching, or a Master Receiver Selector (MRS) (KVH Part #72-0412) to enable automatic (or manual) switching. The MRS also allows you to select which receiver is the master receiver.

Using the Receiver Remote Control to Switch Between Satellites

Some TracVision M9 system configurations allow automatic satellite switching. When automatic switching is enabled, the antenna switches satellites automatically while you change channels using the receiver's remote control. You can also use the MCU to manually switch between your selected satellites with a single button press.

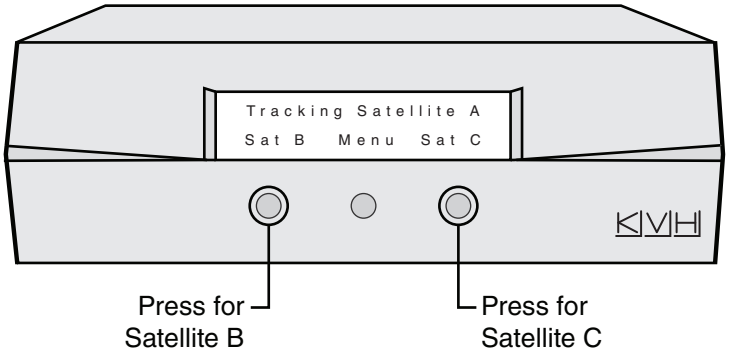
Using the MCU to Switch Between Satellites

You can switch between satellites using the MCU by pressing a single button. Follow the steps below to switch satellites.

NOTE: *If you use the MCU to manually switch satellites, automatic satellite switching is disabled until the system is restarted. For more information on restarting the system, see* *"Restarting the Antenna" on page 30*.

1. Ensure the Tracking Satellite screen is displayed.

Figure 2-4 Tracking Satellite Screen



2. Press the appropriate MCU button to switch satellites (see Figure 2-4).

Product Care

Please consider the following antenna care guidelines for maintaining peak performance:

- Periodically wash the exterior of the antenna dome with fresh water and mild detergent. Avoid harsh cleansers and volatile solvents (such as acetone) and do not spray the dome directly with high-pressure water.

- If you wish to paint the dome, use only non-metallic automotive paint without a primer coat. Any paint that contains metal will block satellite signals and impair reception.

3. Settings

This chapter explains system settings and how to modify them using the MCU.

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Setting the MCU to Track Satellites

You can change which satellites your TracVision M9 system tracks by choosing from preset satellite groups, or selecting up to three satellites of your choice from the satellite library.

Option A - Choosing Preset Satellite Groups

If desired, you can set the TracVision M9 to track one of the following preset groups.

TIP: *Refer to Table 3-2 on page 21 and Table 3-3 on page 23 for a complete list of satellites in the satellite library.*

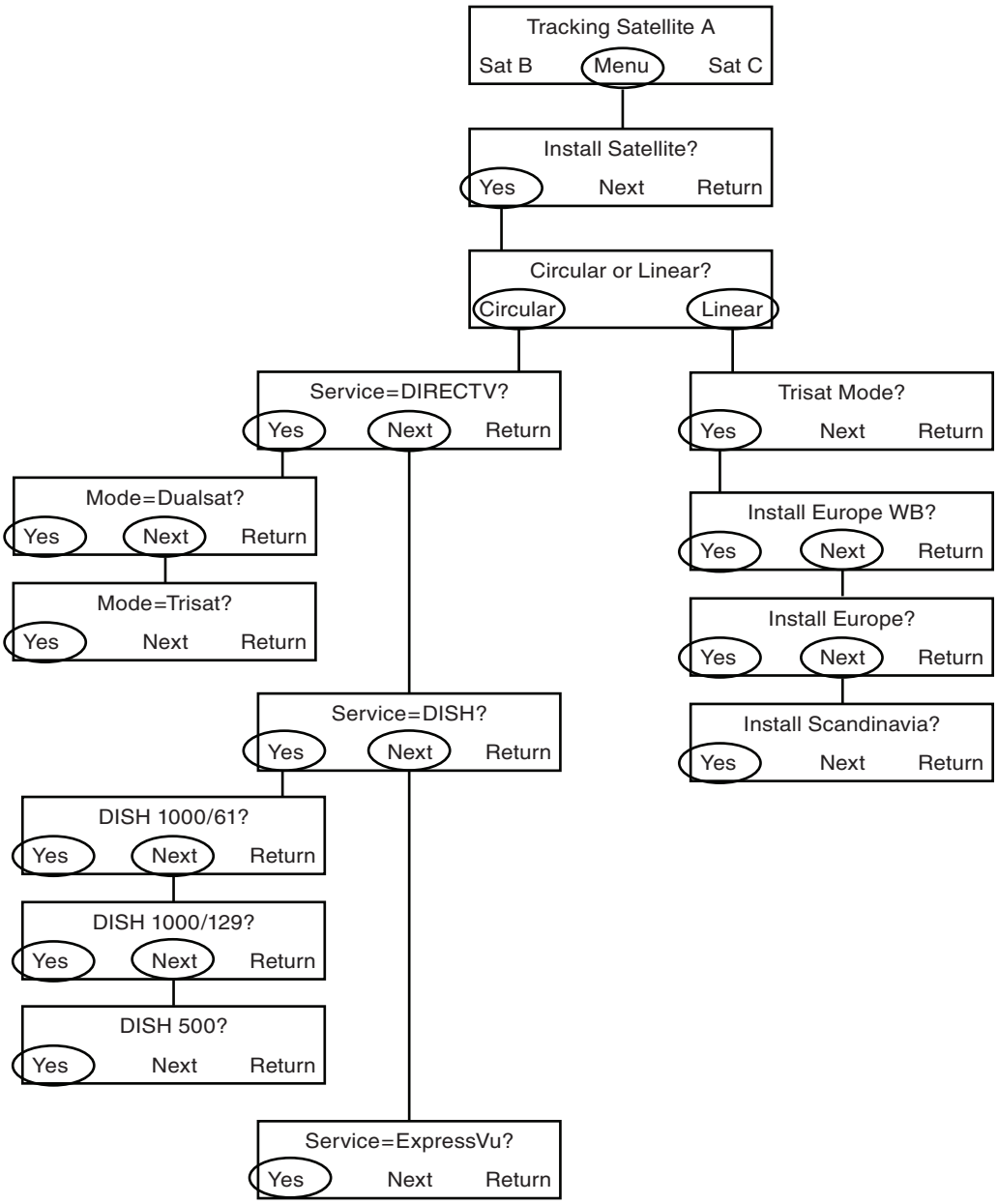
Table 3-1 Preset Satellite Groups

TracVision M9 Version	Preset Group Name	Included Satellites (Common Names)
Circular	DIRECTV (Dual-sat)	DIRECTV 101, 119
	DIRECTV (Tri-sat) (not used)	DIRECTV 101, 110, 119
	DISH 1000/61 (DISH Network)	ECHOSTAR 11, 7, 3
	DISH 1000/129* (DISH Network)	ECHOSTAR 11, 7, 2
	DISH 500 (DISH Network)	ECHOSTAR 11, 7
	Bell TV	NIMIQ 2, 1
Linear	Europe WB	HOTBIRD WB, ASTRA 1, ASTRA 2S
	Europe	HOTBIRD, ASTRA 1, ASTRA 2S
	Scandinavia	HOTBIRD WB, SIRIUS 4, THOR

***NOTE:** Manual switching is required. You can also purchase a TracVision Master Receiver Selector (KVH Part #72-0412) if you wish to enable automatic switching.*

Use the flowchart in Figure 3-1 to set the MCU to track the preset satellite group of your choice.

Figure 3-1 Preset Satellite Groups



Option B - Selecting from the Satellite Library

If desired, you can select up to three satellites from the satellite library for tracking.

Refer to the following tables to determine the satellite installation name of your desired satellites. Western hemisphere satellites are listed in Table 3-2; Eastern hemisphere satellites are listed in Table 3-3 on page 23. Then use the flowchart in Figure 3-2 on page 25 to select your chosen satellites in the antenna for tracking.

NOTE: *Be sure to only install satellites that your TracVision M9 can track in your geographic location. For your convenience, KVH provides links to several web sites that offer satellite coverage information. Simply visit our website at www.kvh.com/footprint or www.satbeams.com.*

NOTE: *If the satellite you wish to track is not listed, you can use a PC to add one or two special user-defined satellites. See "Appendix B" on page 53 for details.*

Table 3-2 Western Hemisphere Satellite Library

Satellite Name	Satellite Position	Installation Name	LNB Type
Amc3	87.0° W	AMC87W	Linear
Amos 2, Europe	4.0° W	AMOSE4W	Linear
Amos 2, Middle East	4.0° W	AMOSM4W	Linear
Atlantic Bird 3, Super Beam	5.0° W	ATLBD5W	Linear
DIRECTV 101	101.0° W	DTV101W	Circular
DIRECTV 110	110.0° W	DTV110W	Circular
DIRECTV 119	119.0° W	DTV119W	Circular
DIRECTV 72	72.0° W	DTV72W	Circular
Echostar 2 (DISH 129)	129.0° W	DSH129W	Circular
Echostar 3 (DISH 61)	61.5° W	DSH61W	Circular
Echostar 7 (DISH 119)	119.0° W	DSH119W	Circular
Echostar 8 (DISH 77)	77.0° W	DSH77W	Circular
Echostar 11 (DISH 110)	110.0° W	DSH110W	Circular

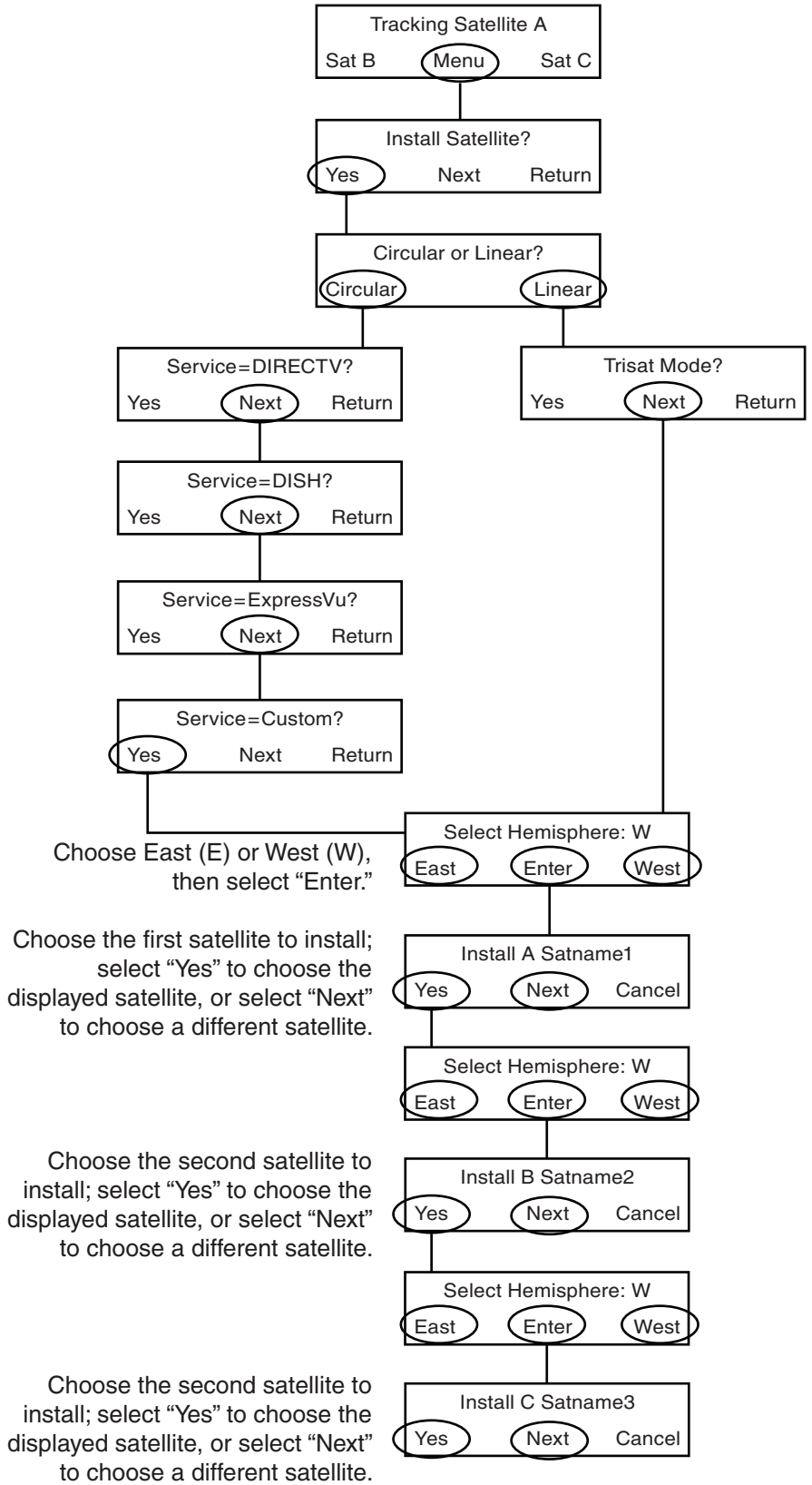
Satellite Name	Satellite Position	Installation Name	LNB Type
Galaxy 18	123.0° W	GLX123W	Linear
Galaxy 19	97.0° W	GLX97W	Linear
Galaxy 25	93.1° W	GLX93W	Linear
Galaxy 3C	95.0° W	GLX95W	Galaxy Circular
Hispasat 1C, America	30.0° W	HSPA30W	Linear
Hispasat 1C, Europe	30.0° W	HSPE30W	Linear
Intelsat 11, Sky Brazil	43.1° W	IT43W	Linear
Intelsat 9, Mexico	58.0W	INT58W	Linear
Intelsat 903, Caribbean (Spot 2)	34.5W	IT34W	Linear
Nilesat 101	7.0° W	NILE7W	Linear
Nimiq 1 (EXPRESSTV)	91.0° W	EXVU91W	Circular
Nimiq 2 (EXPRESSVU)	82.0° W	EXVU82W	Circular
Telstar 12, Americas	15.0° W	TELA15W	Linear
Telstar 12, Europe & South Africa	15.0° W	TELE15W	Linear
Telstar 14 (Estralla Brazil), Brazil	63.0° W	TELB63W	Linear
Thor (includes 2, 3)	0.8° W	THOR1W	Linear

Table 3-3 Eastern Hemisphere Satellite Library

Satellite Name	Satellite Position	Installation Name	LNB Type
Abs 1, North	75.0° E	ABSN75E	Linear
Abs 1, South	75.0° E	ABSS75E	Linear
Agila 2	146.0° E	AGL146E	Linear
Apstar 6	134.0° E	APS134E	Linear
Arabsat (includes Badr 3, 4), Bss Beam	26.0° E	ARAB26E	Linear
Asiasat 3S	105.5° E	ASA105E	Linear
Asiasat 4, Australasia	122.2° E	ASA122E	Linear
Astra 1 (includes 1H, 1KR, 1L, 1M)	19.2° E	AST19E	Linear
Astra 2N (includes Eurobird 1, 2A, 2B, 2C, 2D)	28.2° E	ASTN28E	Linear
Astra 2S (includes 2A, 2B, 2C)	28.2° E	ASTS28E	Linear
Astra 3A (includes 1E, 1G)	23.5° E	AST23E	Linear
Bonum 1	56.0° E	BON56E	Circular
Eutel Sesat	36.0° E	ETLS36E	Linear
Eutelsat W3A, Africa	7.0° E	ETL7E	Linear
Eutelsat W4, Nigeria	36.0° E	ETLN36E	Linear
Eutelsat W4, Russia	36.0° E	ETLR36E	Circular
Eutelsat W5	70.5° E	ETL70E	Linear
Express AM1, Europe Wide Beam	40.0° E	AM40E	Linear
Express AM2, Low Beam	80.0° E	AM80E	Linear
Express AM22, Europe Wide Beam	53.0° E	AME53E	Linear
Express AM22, Middle East S2 Beam	53.0° E	AMM53E	Linear
Express AM3, Low Beam	140.0° E	AM140E	Linear
Hotbird (includes Hotbird 6, 7, 8)	13.0° E	HBD13E	Linear
Hotbird WB (includes Hotbird 6, 7, 8)	13.0° E	HBDW13E	Linear
Insat 3A, 4B, India	93.5° E	ISAT93E	Linear

Satellite Name	Satellite Position	Installation Name	LNB Type
Intelsat 7, South Africa	68.5° E	ITE68E	Linear
Intelsat 8, Australia	166.0° E	IT166E	Linear
Intelsat 10, Africa/Europe	68.5° E	ITE68E	Linear
Intelsat 701, French Polynesia (Spot 3)	180.0° E	ITP180E	Linear
Intelsat 701, New Caledonia (Spot 2)	180.0° E	ITC180E	Linear
Measat 3, India	91.5° E	MEAI91E	Linear
Measat 3, Malaysia	91.5° E	MEAM91E	Linear
Nss 6, India	95.0° E	NSSI95E	Linear
Nss 6, Northeast Asia	95.0° E	NSSN95E	Linear
Nss 6, Southeast Asia	95.0° E	NSSS95E	Linear
Optus C1	156.0° E	OPT156E	Linear
Optus D1	160.0° E	OPT160E	Linear
Sinosat 1	110.5° E	SIN110E	Linear
Sirius 4	5.0° E	SIRI5E	Linear
St1, Southeast Asia (K1 Beam)	88.0E° E	ST88E	Linear
Superbird C2, Japan	144.0° E	SB144E	Linear
Telstar 10	76.5° E	TEL76E	Linear
Telstar 18	138.0° E	TEL138E	Linear
Thaicom 5, Thailand	78.5° E	THAI78E	Linear
Turksat	42.0° E	TRK42E	Linear
Yamal 201	90.0° E	YAM90E	Linear

Figure 3-2 Selecting from the Satellite Library



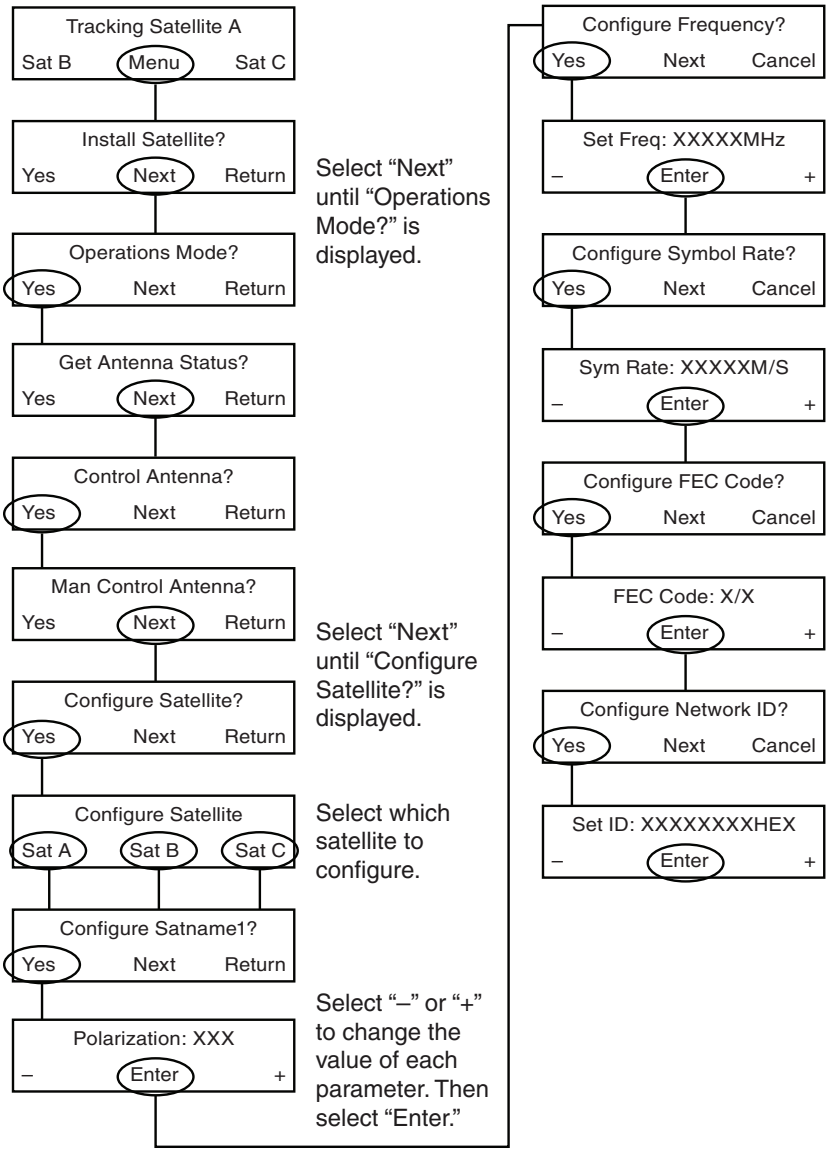
Configuring Satellite Settings

If a satellite's parameters are changed to use different parameters than those stored in the TracVision system, you can use the flowchart in Figure 3-3 to configure one of the satellites selected for tracking.

TIP: *Circular satellites use the following polarization/band combinations: right (RHC) and left (LHC). Linear satellites use the following polarization/band combinations: vertical high (VH), vertical low (VL), horizontal high (HH), and horizontal low (HL).*

TIP: *You can find satellite information on the web at www.lyngsat.com (this website is not affiliated with KVH).*

Figure 3-3 Configuring Satellite Settings



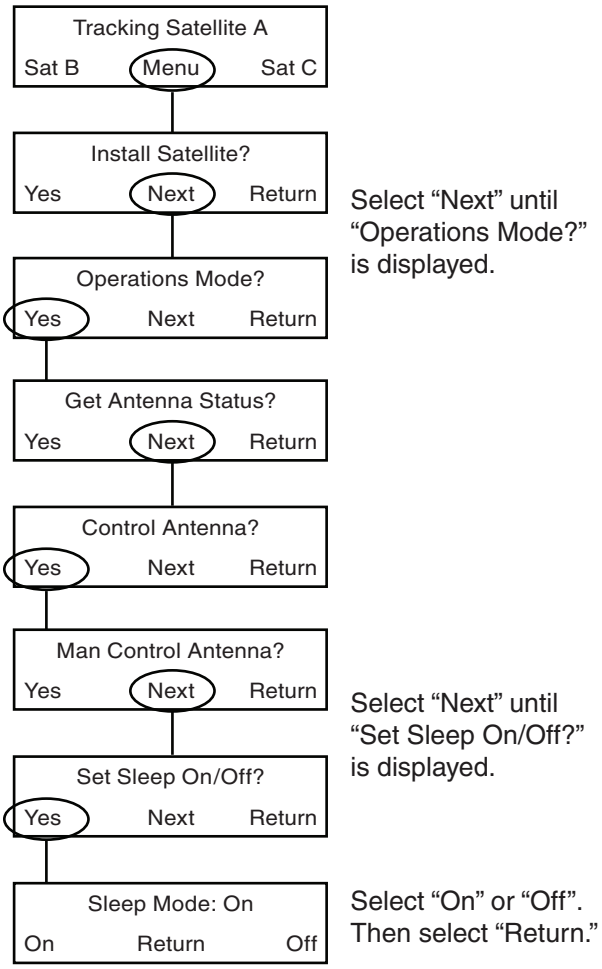
Changing the Sleep Mode Setting

When the vessel has come to a stop and holds its position for one minute (e.g., at a dock), the antenna unit enters Sleep Mode, which locks the antenna in place to conserve power. As soon as the vessel moves beyond a 1° - 2° window or the signal level changes significantly, Sleep Mode automatically turns off and the system begins tracking the satellite again.

KVH recognizes that some customers might not want to take advantage of this convenient feature. In this case, it is possible to disable Sleep Mode.

Use the flowchart in Figure 3-4 if you wish to disable Sleep Mode, or if you wish to restore the original Sleep Mode setting.

Figure 3-4 Setting Sleep Mode On/Off



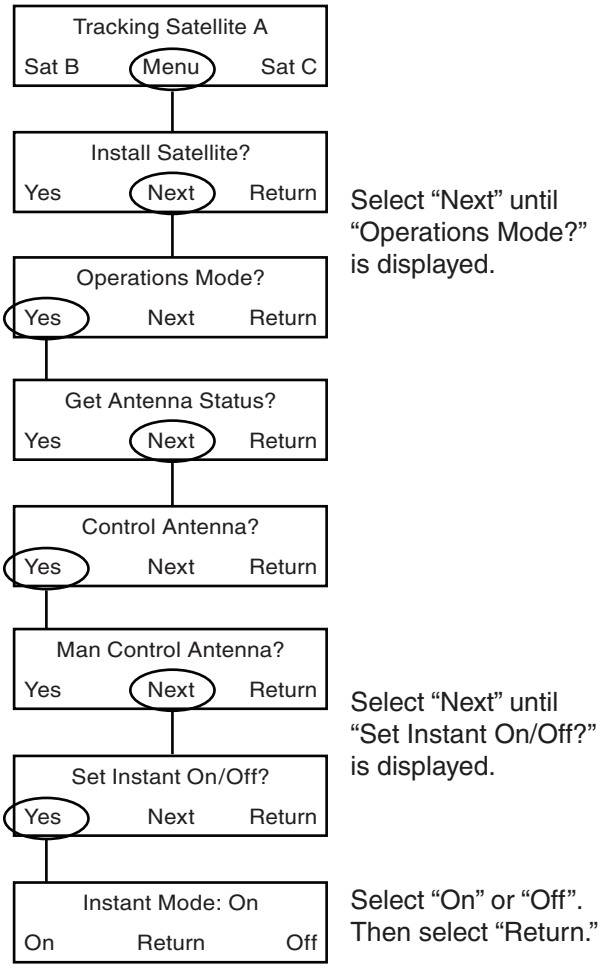
Changing the Instant On Setting

When Instant On is enabled, the antenna can immediately receive signals if the vessel has not moved since the antenna was last shut off. However, if the system is turned off, and then the vessel moves after last acquiring the satellite via Instant On, the antenna will undergo its standard initialization process once it is turned back on. This results in a brief delay.

TIP: *The default Instant On setting is off.*

Use the flowchart in Figure 3-5 if you wish to enable Instant On, or if you wish to restore the original setting.

Figure 3-5 Setting Instant On/Instant Off

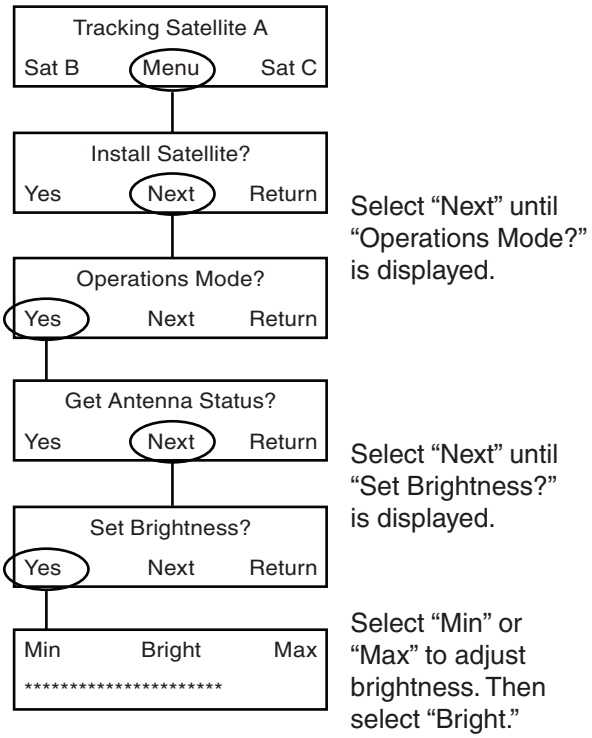


Adjusting Display Brightness

The MCU display brightness can be adjusted to suit your preferences.

Use the flowchart in Figure 3-6 if you wish to adjust the display brightness, or if you wish to restore the original brightness setting.

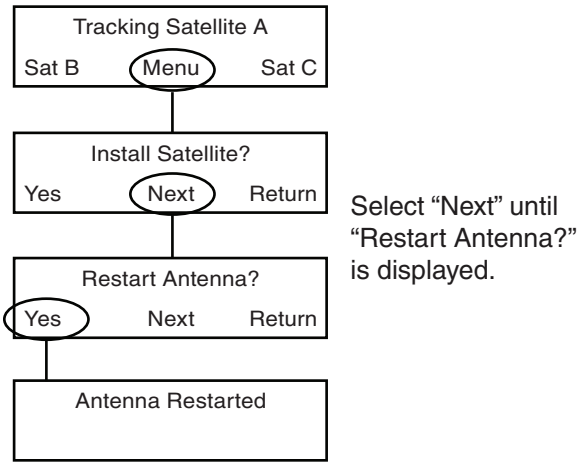
Figure 3-6 Setting Display Brightness



Restarting the Antenna

Use the flowchart in Figure 3-7 if you wish to restart the antenna.

Figure 3-7 Restarting the Antenna



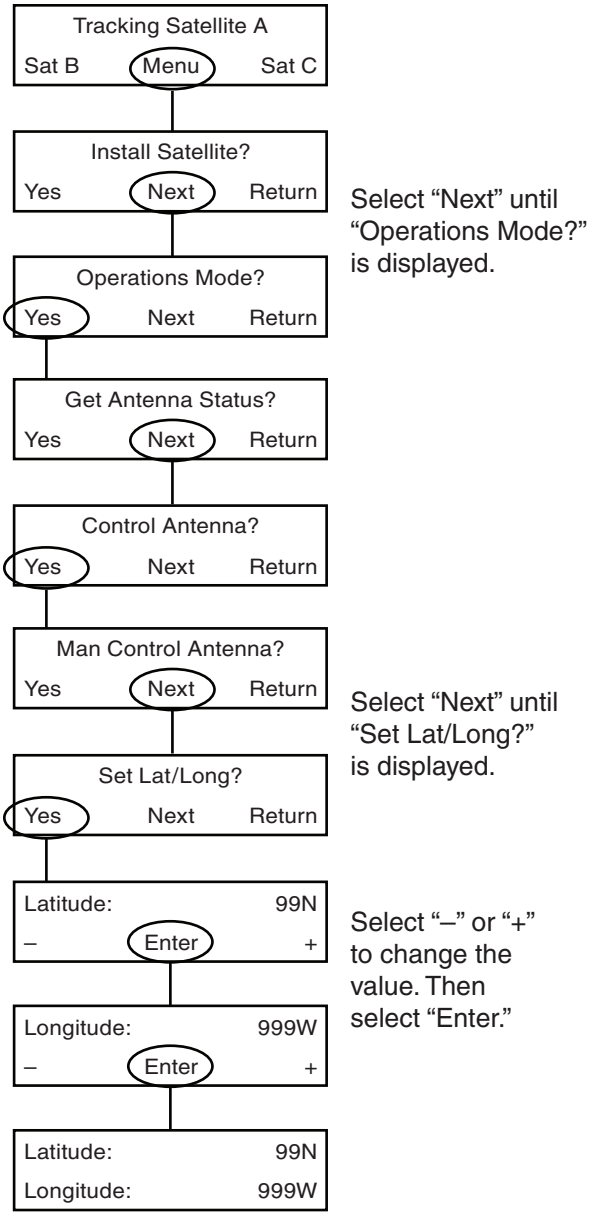
Manually Setting Latitude and Longitude

If the GPS is blocked or unavailable, you can manually set the vessel's latitude and longitude data. Manually set latitude and longitude values are automatically overwritten once valid GPS is detected.

Use the flowchart in Figure 3-8 if you wish to manually set the latitude and longitude.

TIP: *If the "Lat/Long not valid for Sat Pair" message appears, recheck and re-enter your installed satellites.*

Figure 3-8 Manually Setting the Latitude and Longitude



4. Troubleshooting

This chapter identifies potential basic problems along with their possible causes and solutions. It also explains how to get technical support.

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Troubleshooting Matrix..... 36
Causes and Remedies for Operational Issues 37
Technical Support..... 41

Four Simple Checks

If you are experiencing a problem receiving satellite TV with your TracVision system, perform the four simple checks below.

TIP: *You can also try resetting the satellite TV receiver. Turn off and unplug the receiver, wait one minute, then plug it back in and turn it back on.*

Can the antenna see the satellite?

The antenna requires an unobstructed view of the sky to receive satellite TV signals. Common causes of blockage include trees, buildings, bridges, and mountains.

Is there excessive dirt or moisture on the antenna dome?

Dirt buildup or moisture on the dome can reduce satellite reception. Clean the exterior of the dome periodically.

Is it raining heavily?

Heavy rain or snow can weaken satellite TV signals. Reception should improve once the inclement weather subsides.

Is everything turned on and connected properly?

Make sure your TV and receiver are both turned on and set up for the satellite input. Finally, check any connecting cables to ensure none have come loose.

Troubleshooting Matrix

The troubleshooting matrix identifies potential operational symptoms and their causes and remedies. "Causes and Remedies for Operational Issues" on page 37 contains detailed information on the causes and remedies listed below.

Figure 4-1 Troubleshooting Matrix

SYMPTOM / CAUSES AND REMEDIES	Receiver fault or improper receiver configuration	Satellite coverage issue	Satellite signal blocked	Radar interference	Satellite frequency data changed	Vessel turning during startup	Insufficient power	Improper wiring	Loose RF connectors	Type of multiswitch used	Cable unwrap
Antenna non-functional							x	x	x		
Antenna not switching satellites	x	x	x	x			x	x	x		
No picture on TV set	x	x	x	x					x	x	
Certain channels do not work	x	x	x		x		x	x	x		
Intermittent picture for short intervals		x	x	x		x			x	x	x
System will not find satellite	x	x	x	x	x	x	x	x	x	x	
Snowy television picture	x						x	x	x		
Pixelating television picture	x		x	x			x	x	x		

Causes and Remedies for Operational Issues

This section addresses the most common operational issues that can affect the performance of the TracVision M9. If your TracVision system requires service, you can visit any KVH-authorized dealer or distributor for assistance. To find a KVH-authorized dealer near you, visit www.kvh.com/wheretogetservice.

Receiver Fault or Improper Receiver Configuration

Receiver Fault

Your satellite TV receiver might be set up incorrectly or defective. First check the receiver's configuration to ensure it is set up for the desired programming. In the case of a faulty receiver, refer to your selected receiver's user manual for service and warranty information.

Improper Receiver Configuration (Linear Systems Only)

To ensure proper operation, the receiver(s) must be set up for the same satellites, and in the same order, they are set up in the antenna:

Antenna Satellite	Receiver Satellite	DiSEqC Setting
Sat. A	Alternative 1 or A	DiSEqC 1
Sat. B	Alternative 2 or B	DiSEqC 2
Sat. C	Alternative 3 or C	DiSEqC 3

Satellite Coverage Issue

Television satellites are located in fixed positions above the Earth's equator and beam TV signals down to certain regions of the planet (not worldwide). To receive TV signals from a satellite, you must be located within that satellite's unique coverage area.

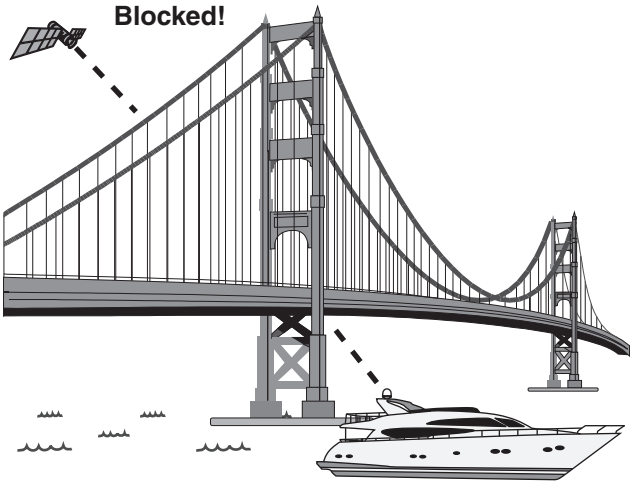
TIP: *For your convenience, KVH provides links to several web sites that offer satellite coverage information. Simply visit our website at www.kvh.com/footprint or www.satbeams.com.*

Figure 4-2 Location and Coverage Area of DIRECTV 101 Satellite

Satellite Signal Blocked

Since TV satellites are located above the equator, the TracVision antenna must have a clear view of the sky to receive satellite TV signals. Anything that stands between the antenna and the satellite can block the signal, resulting in lost reception. Common causes of blockage include trees, buildings, and bridges. Heavy rain, ice, or snow might also temporarily interrupt satellite signals.

Figure 4-3 Example of Satellite Blockage



Radar Interference

The TracVision M9 antenna must be kept out of line with nearby radars, as their energy levels might overload the antenna's front-end circuits. Refer to the TracVision M9 Installation Guide for details or visit any KVH-authorized dealer or distributor for assistance. To find a KVH-authorized dealer near you, visit www.kvh.com/wheretogetservice.

Satellite Frequency Data Changed

If some channels work, while one or more other channels do not, or if the antenna cannot find the selected satellite, the satellite's frequency data might have changed. You can visit any KVH-authorized dealer or distributor for assistance. To find a KVH-authorized dealer near you, visit www.kvh.com/wheretogetservice.

Vessel Turning During Startup

If the vessel turns during the first minute after startup, the gyro calibration that occurs during startup will be inaccurate. This might cause the TracVision M9 to track improperly. To solve this problem, simply turn off the TracVision M9 system for at least ten seconds. Then turn on the TracVision system, ensuring the vessel is either motionless or traveling in a straight line for the first minute after startup.

Insufficient Power

Insufficient power can prevent proper operation. Refer to the TracVision M9 Installation Guide for details on supplying adequate power to the antenna or visit any KVH-authorized dealer or distributor for assistance. To find a KVH-authorized dealer near you, visit www.kvh.com/wheretogetservice.

Improper Wiring

If the system has been improperly wired, the antenna will not operate correctly. Refer to the TracVision M9 Installation Guide for complete system wiring information or visit any KVH-authorized dealer or distributor for assistance. To find a KVH-authorized dealer near you, visit www.kvh.com/wheretogetservice.

Loose RF Connectors

KVH recommends periodically checking the antenna unit's cable connections. A loose RF connector can reduce signal quality or prevent automatic satellite switching using the receiver's remote control. Refer to the TracVision M9 Installation Guide for complete system wiring information or visit any KVH-authorized dealer or distributor for assistance. To find a KVH-authorized dealer near you, visit www.kvh.com/wheretogetservice.

Type of Multiswitch Used

If your TracVision system's configuration requires a multiswitch, an active (powered) multiswitch must be used to ensure proper antenna performance. Receiver wiring diagrams are provided in "Appendix C" on page 63.

Cable Unwrap

If your vessel makes several consecutive circles in the same direction, the antenna will rotate 720° before reaching the end of its internal cable. If this occurs, the system will automatically unwrap the cable by quickly rotating the antenna dish in the opposite direction. During this time, your TV picture will freeze momentarily.

Technical Support

The TracVision M9 antenna is a sophisticated electronic device; only KVH-authorized technicians have the specialized tools and expertise necessary to diagnose and repair a system fault. Therefore, if you experience any operating problem or require technical assistance, please call or visit your local authorized TracVision dealer or distributor. You can find an authorized technician near you by visiting our website at www.kvh.com/wheretogetservice.

If you need help finding an authorized technician, please contact KVH Technical Support:

North America, South America, Australia, New Zealand:
Phone: +1 401 847-3327
E-mail: techs@kvh.com
(Mon.-Fri., 9:00 am-6:00 pm ET, -5 GMT)
(Sat., 9:00 am-2:00 pm ET, -5 GMT)

Europe, Middle East, Asia:
Phone: +45 45 160 180
E-mail: support@kvh.dk
(Mon.-Fri., 8:00 am-4:30 pm, +1 GMT)

Please have your antenna serial number handy before you call. For information on retrieving your antenna serial number, refer to "Displaying the Antenna Serial Number" on page 50.

Appendix A Advanced Settings and Functions

This appendix contains information on advanced settings and functions. This information should only be utilized by KVH-authorized technicians.

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Updating Satellite Frequency Data 46
Changing the Sidelobe Mode Setting 48
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A

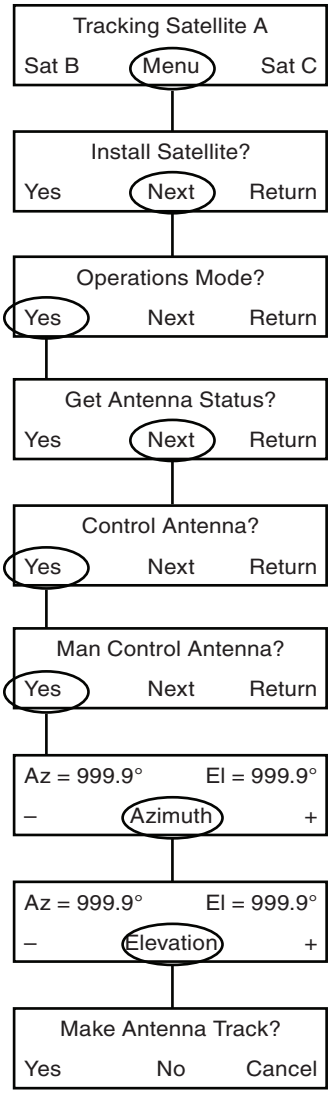
Manually Controlling the Antenna

Use the flowchart in Figure A-1 if you wish to control the antenna manually.

NOTE: *If you are performing this procedure as part of the satellite frequency scan update procedure, be sure to select "NO" at the "Make Antenna Track" screen.*

TIP: *Once you have finished positioning the antenna, the system will revert to automatic control.*

Figure A-1 Manually Controlling the Antenna



Select "Next" until "Operations Mode?" is displayed.

Select "–" or "+" to change the azimuth value relative to the vessel's bow (not a magnetic reference). Then select "Azimuth."

Select "–" or "+" to change the elevation value. Then select "Elevation."

Select "Yes" if you wish to make the antenna track. **Note**: If you are performing this procedure as part of a satellite frequency scan, select "No."

Updating Satellite Frequency Data

If the antenna is unable to find a satellite, or if you are unable to receive certain channels, the satellite's frequency data might have changed. The satellite frequency scan feature allows you to update the frequency data of any satellite stored in the system's library.

With the desired satellite, band, and polarization selected, the system will automatically search for the frequency with the strongest signal. The system will then update that satellite's programmed data with the new frequency (and associated network ID) and store it in the satellite library.

You will need to enter the following information:

- Symbol rate (valid range: 01000 - 39999)
- FEC code (valid codes: 1/2, 2/3, 3/4, 5/6, 6/7, and 7/8)

You can find satellite information on the web at www.lyngsat.com (this website is not affiliated with KVH).

To update the satellite frequency data, follow the steps below.

IMPORTANT!

The vessel must remain stationary throughout this procedure.

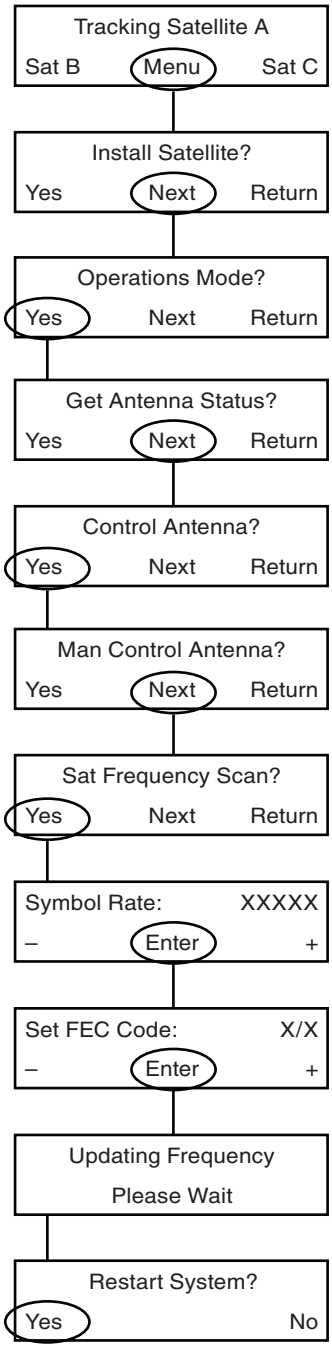
1. Set your satellite receiver to signal meter mode. Refer to your selected receiver's user manual for details.

IMPORTANT!

Ensure that the TV signal meter indicates that you have a strong signal.

2. Using the receiver, select the desired polarization and band. Refer to your selected receiver's user manual for details.
3. If the system is unable to locate the selected satellite, you can manually point the antenna. Refer to "Manually Controlling the Antenna" on page 45 for details.
4. Use the flowchart in Figure A-2 on page 47 to scan the frequency data of the selected satellite.

Figure A-2 Scanning Frequency Data



Select "Next" until "Operations Mode?" is displayed.

Select "Next" until "Sat Frequency Scan?" is displayed.

Select "–" or "+" to change the symbol rate. Then select "Enter."

Select "–" or "+" to change the FEC Code. Then select "Enter."

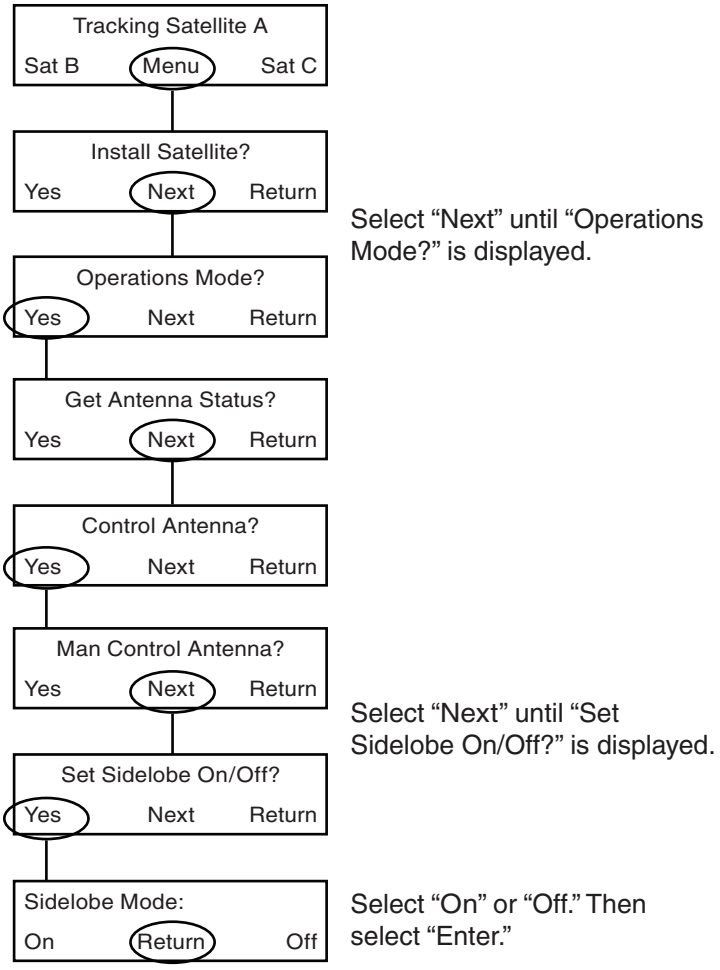
Wait up to 10 minutes for updating to complete.

Changing the Sidelobe Mode Setting

When the Sidelobe Mode is set to on, the antenna takes additional time to validate the satellite signal. Only change the Sidelobe Mode setting if directed by KVH Technical Support. Use the flowchart in Figure A-3 if you need to change the Sidelobe Mode setting.

TIP: *The default Sidelobe Mode setting is off.*

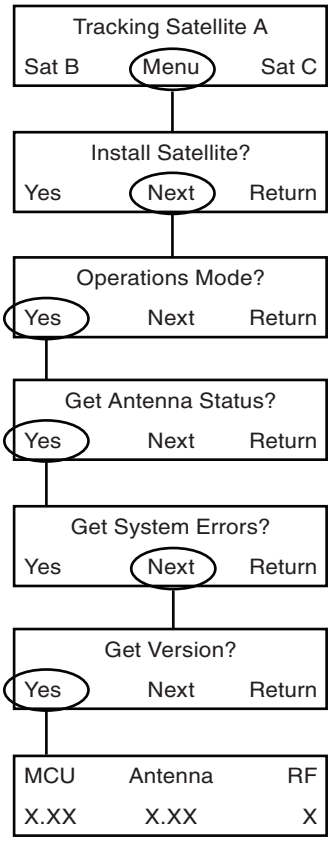
Figure A-3 Changing the Sidelobe Mode Setting



Displaying Software Version Information

Use the flowchart in Figure A-4 if you wish to display software version information.

Figure A-4 Displaying Software Version Information

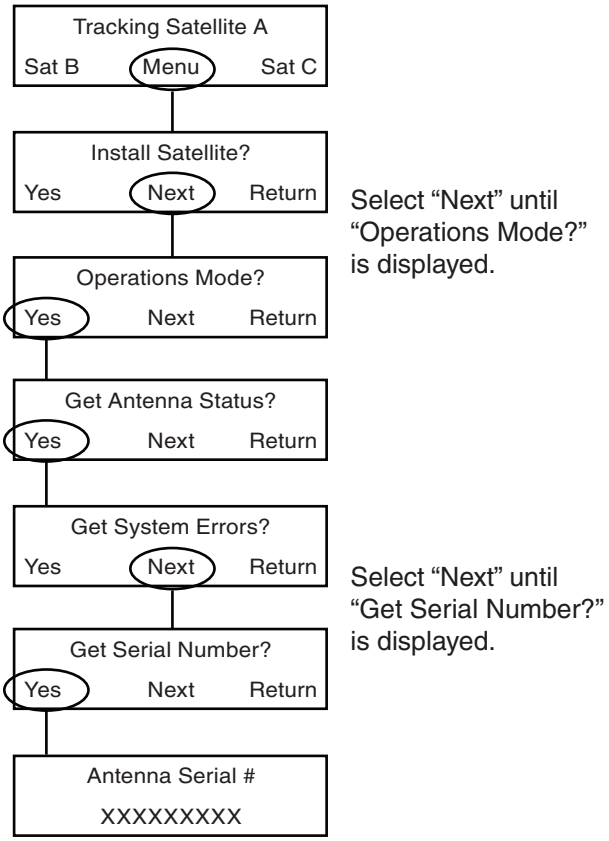


Select "Next" until "Operations Mode?" is displayed.

Displaying the Antenna Serial Number

Use the flowchart in Figure A-5 if you wish to display the antenna serial number.

Figure A-5 Displaying Antenna Serial Number



Other Advanced Settings

Not all MCU menu options are used in this configuration. The following menu options are not used:

- Get System Errors
- Get Skew Angle
- Get Bit Error Rate
- Get Thres/Sig level
- Get State
- Upgrade Software

Appendix B Programming User-defined Satellites

This appendix explains how to program a user-defined satellite(s) into the antenna, if necessary. The TracVision M9 includes a library of common satellites that you can choose from. However, if the satellite(s) you wish to track is not listed, follow the instructions in this appendix to program your desired satellite(s). For a complete listing of satellites in the satellite library, see "Setting the MCU to Track Satellites" on page 19.

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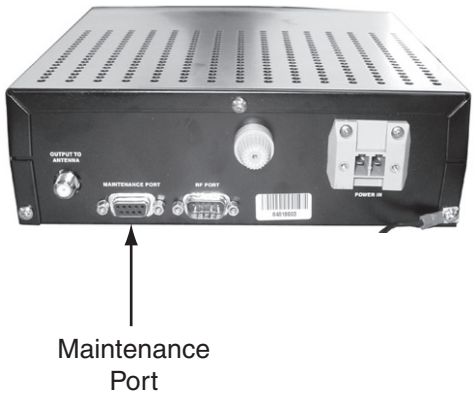
Connect a PC to the Maintenance Port

To program your user-defined satellite(s), you first need to connect a PC with Windows® HyperTerminal installed.

TIP: *If you are a KVH-authorized technician, you can use the KVH Flash Update Wizard instead of HyperTerminal. Enter commands in the wizard's "Antenna Comms" window. You do not need to flash the antenna to enter commands.*

1. Turn off the TracVision system.
2. Connect one end of a straight serial data cable to the maintenance port on the back of the MCU. Connect the other end of the data cable to the serial port on your PC.

Figure B-1 Maintenance Port on MCU

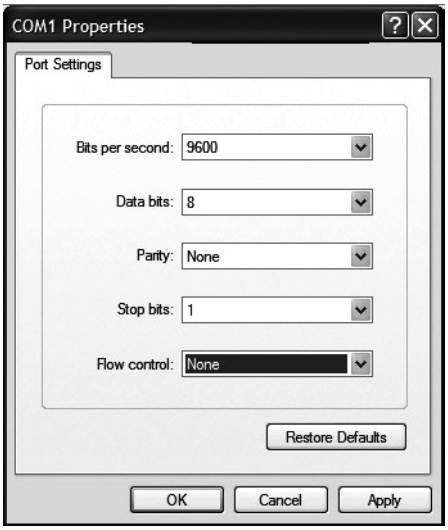


TIP: *If your computer does not have a DB9 serial COM port, you can use the following USB-to-RS232 adapters: IO Gear Part # GUC232A (visit www.iogear.com), Belkin Part # F5U109, or Part # F5U409 (visit www.belkin.com). Windows Vista® users requiring a USB adapter should use Belkin Part #F5U409; some Vista compatibility issues have been found with IO Gear model #GUC232A.*

3. Open HyperTerminal and establish the following settings:

   - Bits per second: 9600
   - Data bits: 8
   - Parity: None
   - Stop Bits:1
   - Flow Control: None

Figure B-2 HyperTerminal Settings



TIP: *To view characters on the screen as you type, set up HyperTerminal to echo typed characters. Select "Properties" from the File menu; select "ASCII Setup" at the Settings tab; then select "Echo typed characters locally" at the ASCII Setup window.*

4. Turn on the TracVision system.

Programming Your User-defined Satellite(s)

To configure a user-defined satellite, you will need to program the following satellite information into the antenna:

- Satellite name
- Satellite longitudinal position
- Transponder information for all applicable combinations of polarization/band:
  - Frequency
  - Symbol rate
  - FEC code
  - Network ID
  - Decoder type

TIP: *Linear satellites use the following polarization/band combinations: vertical high, vertical low, horizontal high, and horizontal low. Circular satellites use the following polarization/band combinations: right and left.*

TIP: *You can find satellite information on the web at www.lyngsat.com (this website is not affiliated with KVH).*

1. Connect a PC to the maintenance port, as described in "Connect a PC to the Maintenance Port" on page 55. Then type the following commands in the HyperTerminal window.
2. Type **HALT** then press Enter.

3. Type the following **SATCONFIG** command then press Enter:

SATCONFIG,*X*,*A*,*B*,*C*,*D*

Field	Description
X	User-defined satellite stored in antenna library (User1 = User-defined Satellite 1 or User2 = User-defined Satellite 2)
A	Longitude (0-180)
B	E (East) or W (West)
C	Decoding type (2 = DSS, 3 = DVB)
D	Polarization (L = linear) (C = circular)

4. Type **@DEBUGON** then press Enter.

5. Type the following **@SATCONFIG** command then press Enter:

@SATCONFIG,*X*,*E*,*F*,*G*,*H*,*I*,*J*,*K*

Field	Description
X	User-defined satellite stored in antenna library (User1 = User-defined Satellite 1 or User2 = User-defined Satellite 2)
D	Satellite table # (98 = User1; 99 = User2)
E	Frequency, MHz (00000 or 10700-12700)
F	Symbol rate, kilosymbols per second (10000-45000)
G	FEC code (12, 23, 34, 56, 67, or 78)
H	Network ID, hexadecimal (0x####)
I	Polarization (V = vertical; H = horizontal; R = right; L = left)
J	LNB down conversion frequency (U = USA [11250 MHz]; L = low [9750 MHz]; H = high [10600 MHz]; G = Latin America [10500 MHz]; S = Sinosat [11300 MHz])
K	Decoding type (2 = DSS, 3 = DVB)

6a. (Linear systems only) - Repeat Step 5 for each polarization/band:

- Vertical High
- Horizontal High
- Vertical Low
- Horizontal Low

6b. (Circular systems only) - Repeat Step 5 for each polarization/band:

- Right
- Left

If your selected satellite does not have information for one or more of these transponder categories, you can enter the following defaults instead:

Transponder Data	Default Value
Frequency	00000
Symbol rate	27500
FEC code	Same value as other transponders with valid data
Network ID	0x0000

7. Type **ZAP** then press Enter. The antenna restarts. Wait one minute for system startup.

8. Refer to "Setting the MCU to Track Satellites" on page 19 to select your new user-defined satellite(s) for tracking from the satellite library. Be sure use the following installation names for your user-defined satellite(s):

Satellite	Installation Name
User-defined Satellite 1	USER1
User-defined Satellite 2	USER2

Example - Linear Satellite

The following is an example of programming the fictional "YOURSAT 7" as the USER1 user-defined satellite.

YOURSAT 7 at 7°W, DVB decoder, linear polarization

Transponder Data	Value
Horizontal High	
Frequency	11.966 GHz
Symbol rate	27500
FEC code	3/4
Network ID	2048 (dec) = 0x0800
Vertical High	
Frequency	11.823 GHz
Symbol rate	27500
FEC code	3/4
Network ID	2048 (dec) = 0x0800
Vertical Low	
No data listed	
Horizontal Low	
No data listed	

Based on the above information, you would enter the following commands into the HyperTerminal window:

```
HALT
SATCONFIG,USER1,7,W,3,L
@DEBUGON
@SATCONFIG,A,11966,27500,34,0x0800,H,H,3
@SATCONFIG,A,11823,27500,34,0x0800,V,H,3
@SATCONFIG,A,00000,27500,34,0x0000,V,L,3
@SATCONFIG,A,00000,27500,34,0x0000,H,L,3
ZAP
```

Example - Circular Satellite

The following is an example of programming the fictional "YOURSAT 122" as the USER2 user-defined satellite.

YOURSAT 122 at 122°W, DVB decoder, circular polarization

Transponder Data	Value
Right	
Frequency	12.225 GHz
Symbol rate	20000
FEC code	5/6
Network ID	4100 (dec) = 0x1004
Left	
Frequency	12.456 GHz
Symbol rate	20000
FEC code	5/6
Network ID	4100 (dec) = 0x1004

Based on the above information, you would enter the following commands into the HyperTerminal window:

```
HALT
SATCONFIG,USER2,122,W,3,C
@DEBUGON
@SATCONFIG,B,99,12225,20000,56,0x1004,R,U,3
@SATCONFIG,B,99,12456,20000,56,0x1004,L,U,3
ZAP
```

Appendix C
Wiring Diagrams

This appendix provides receiver wiring diagrams for TracVision M9 configurations. Wiring diagrams vary according to system configuration. For installation instructions, refer to the TracVision M9 Installation Guide.

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Linear Sky Mexico Version

Wiring One or Two Receivers 70

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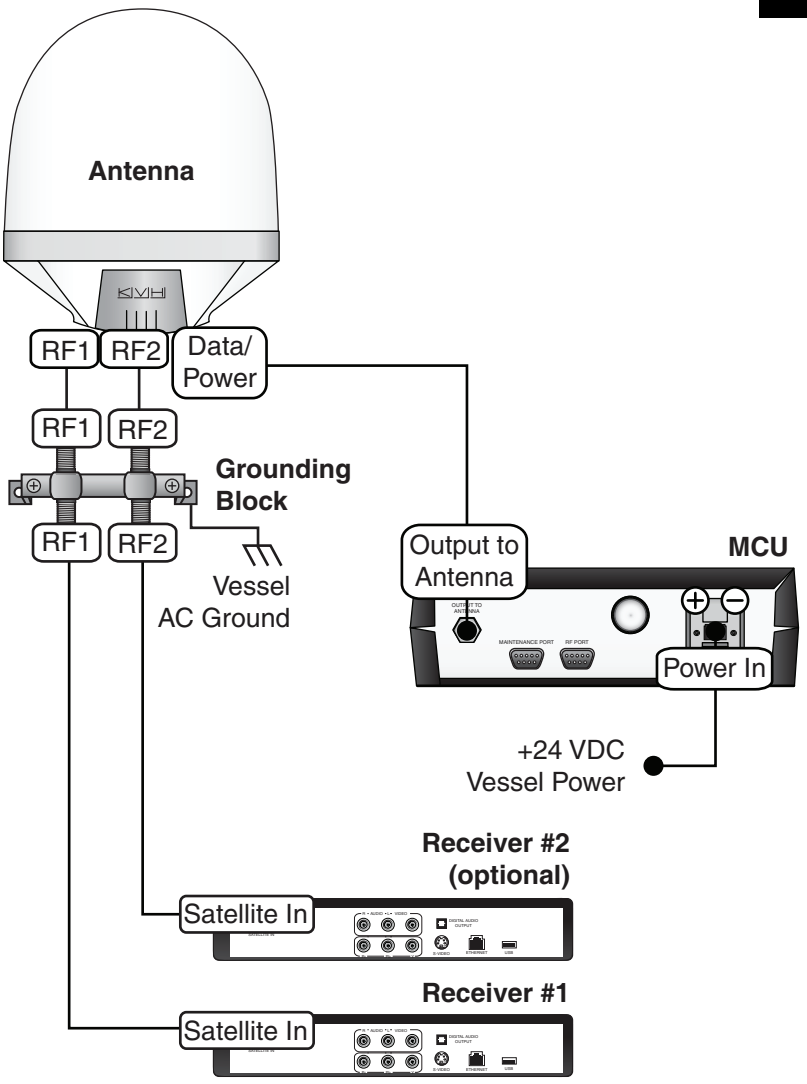
C

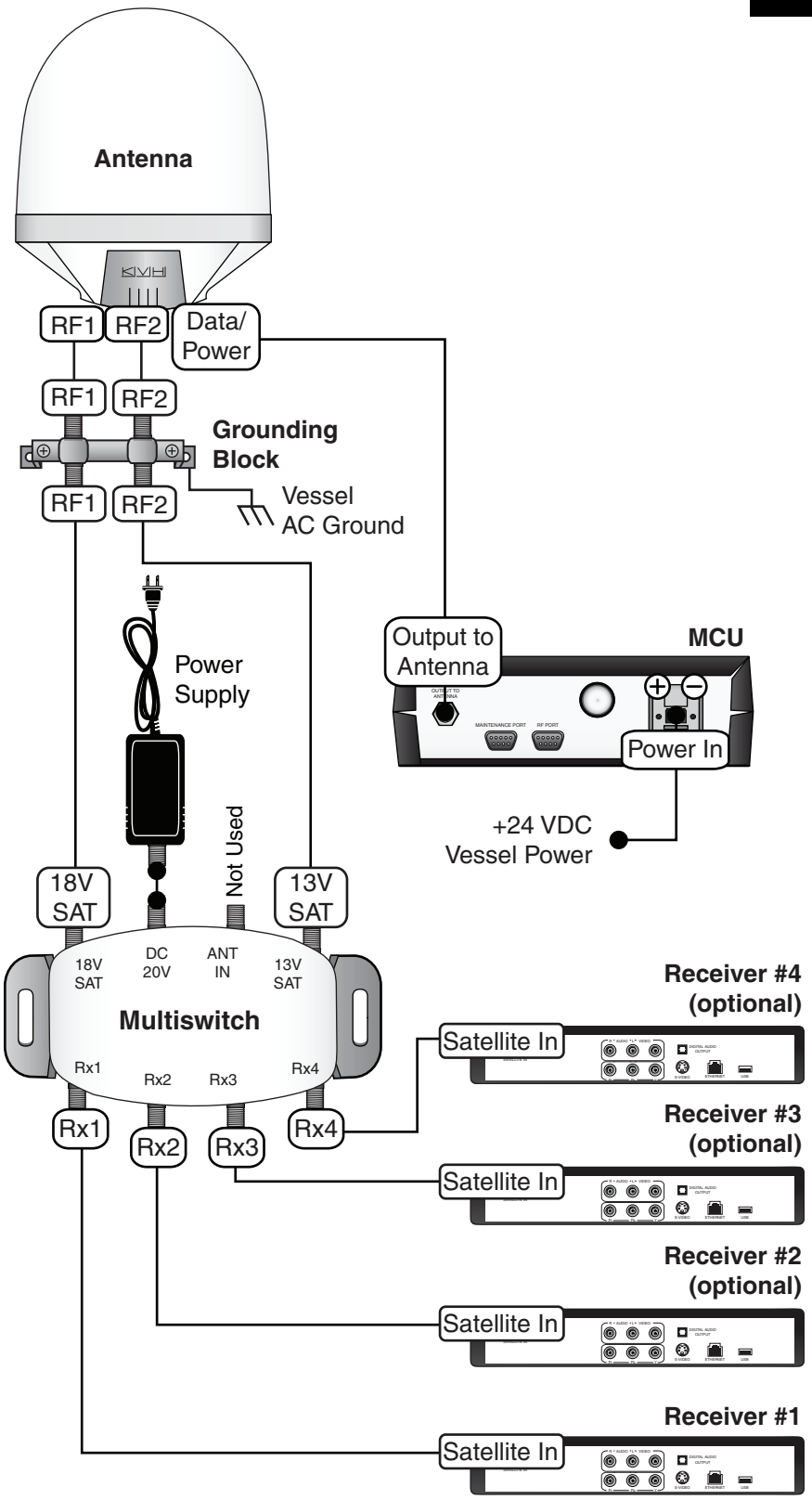
Wiring One or Two Receivers

Circular Version



Wiring Three or Four Receivers

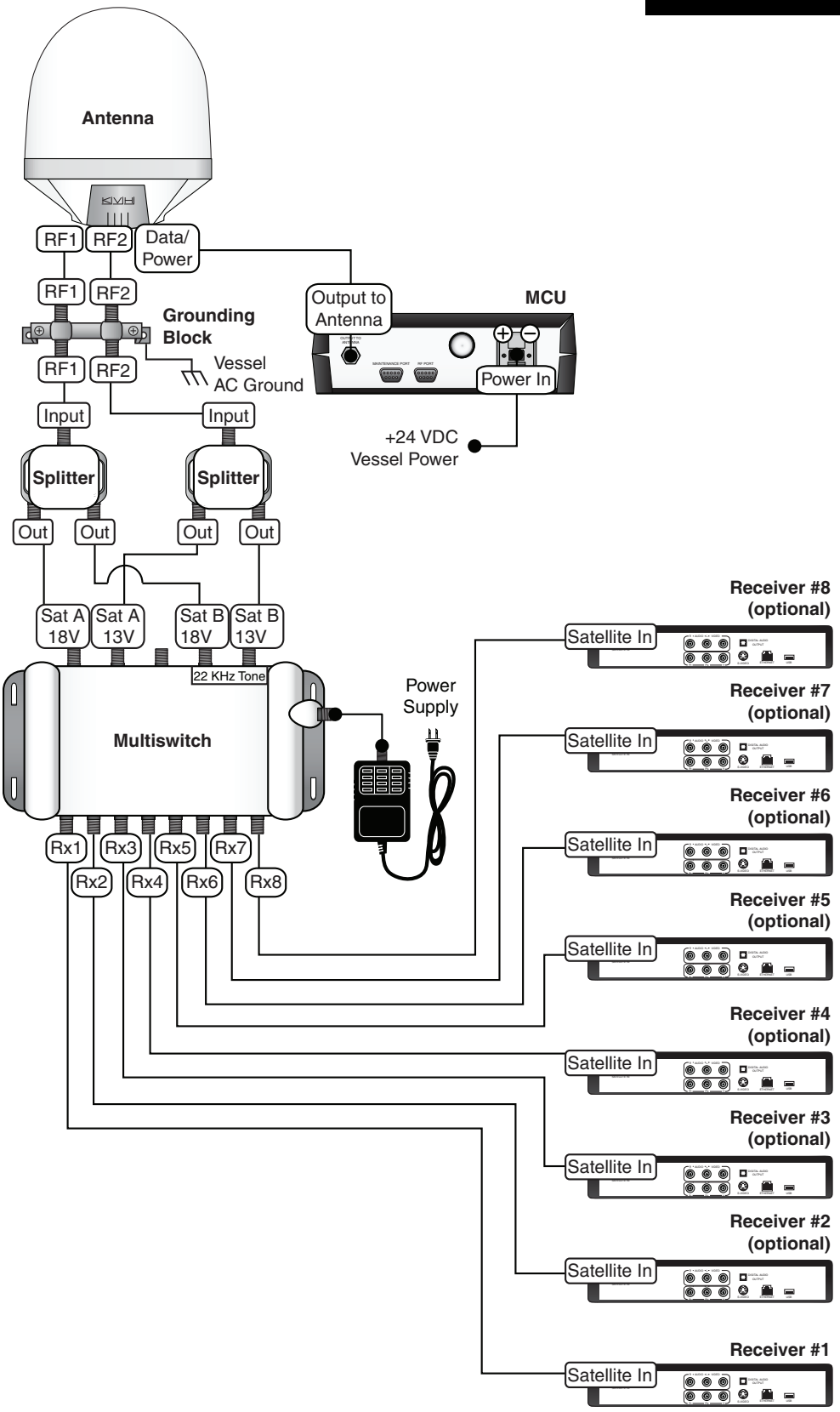
Circular Version



NOTE: *This wiring diagrams includes an Eagle Aspen® multiswitch (KVH Part # 72-0310).*

Wiring Up to Eight Receivers

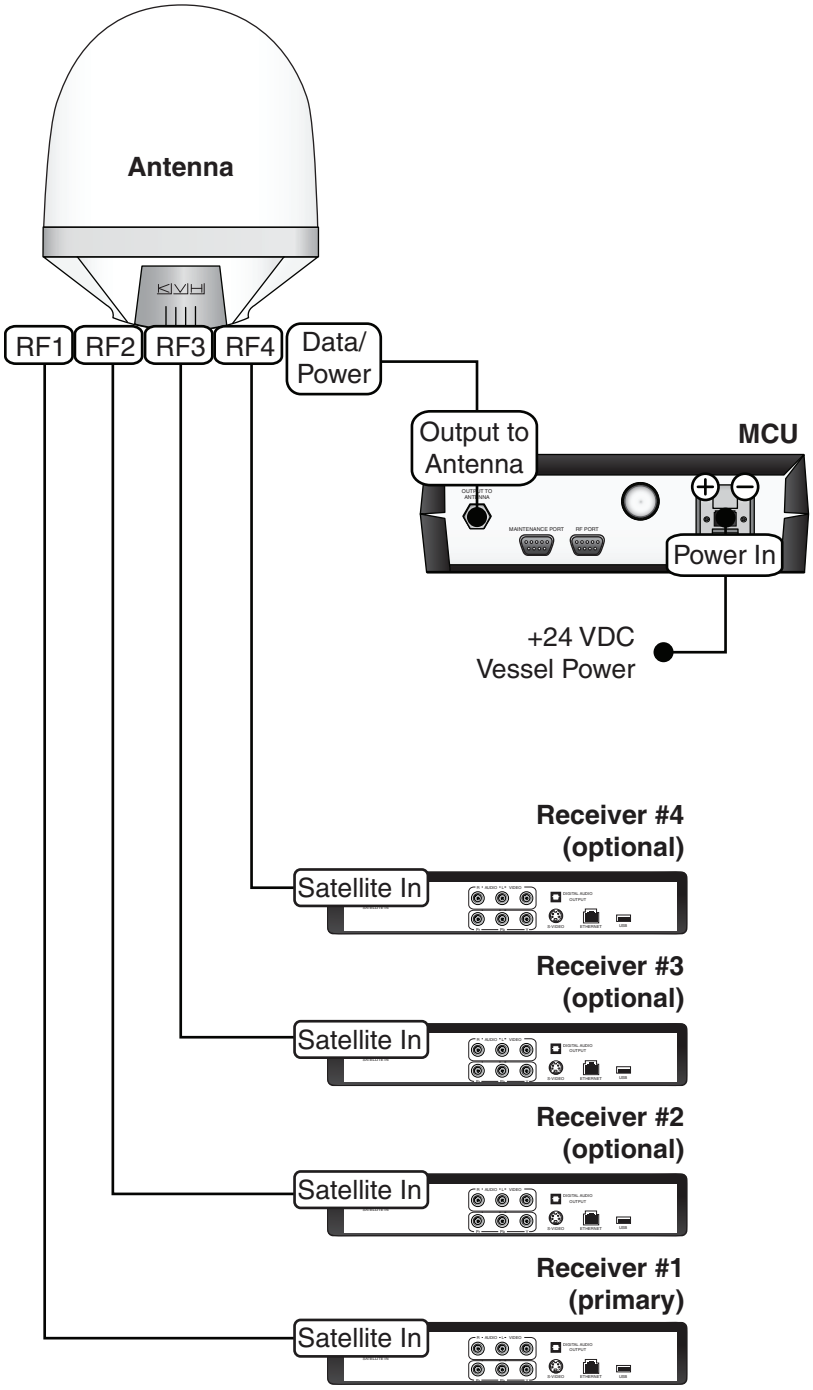
Circular Version



NOTE: *This wiring diagrams includes a Terk® multiswitch (KVH Part # 19-0573).*

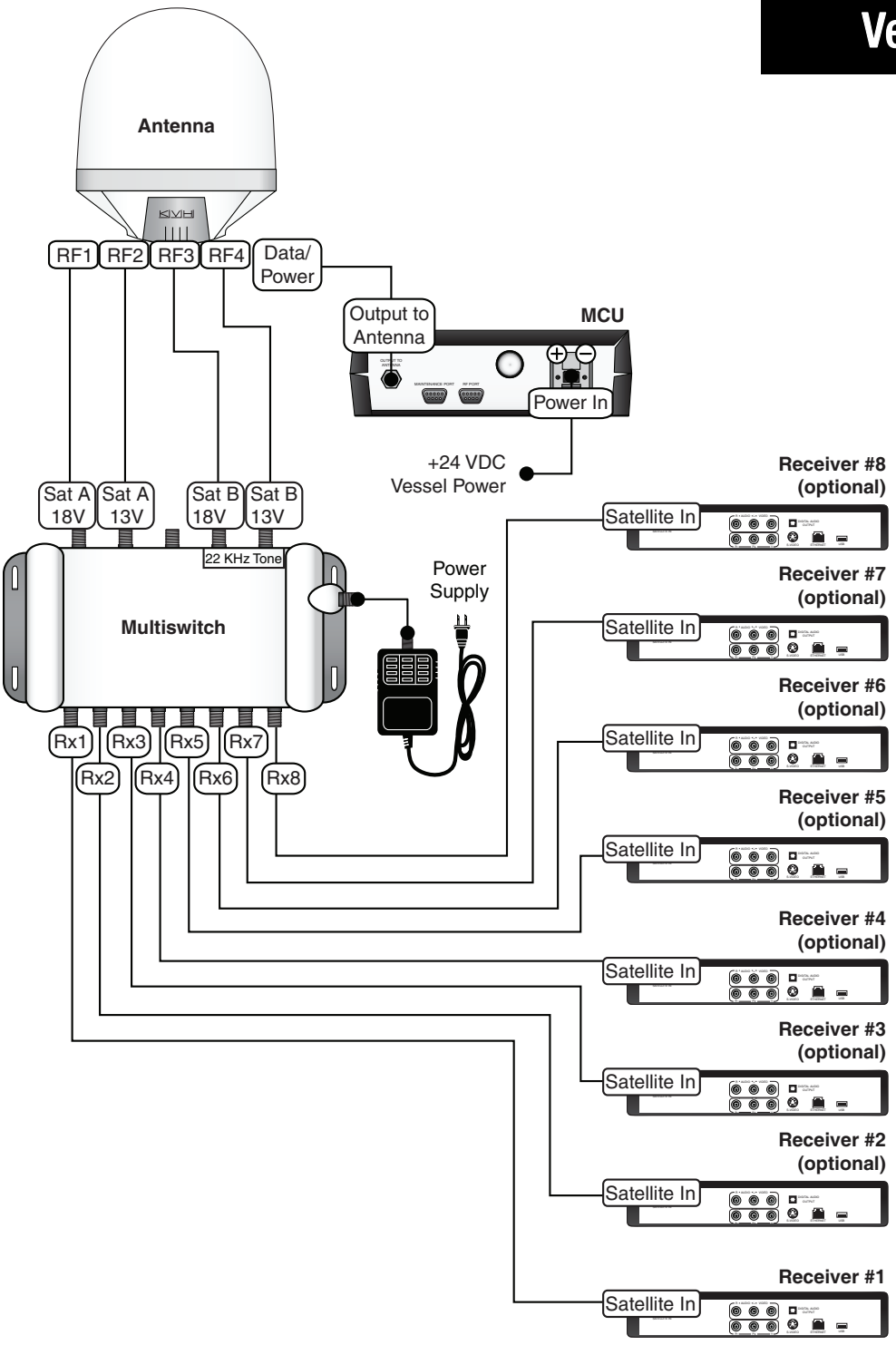
Wiring Up to Four Receivers

Linear Quad Version



Wiring Up to Eight Receivers

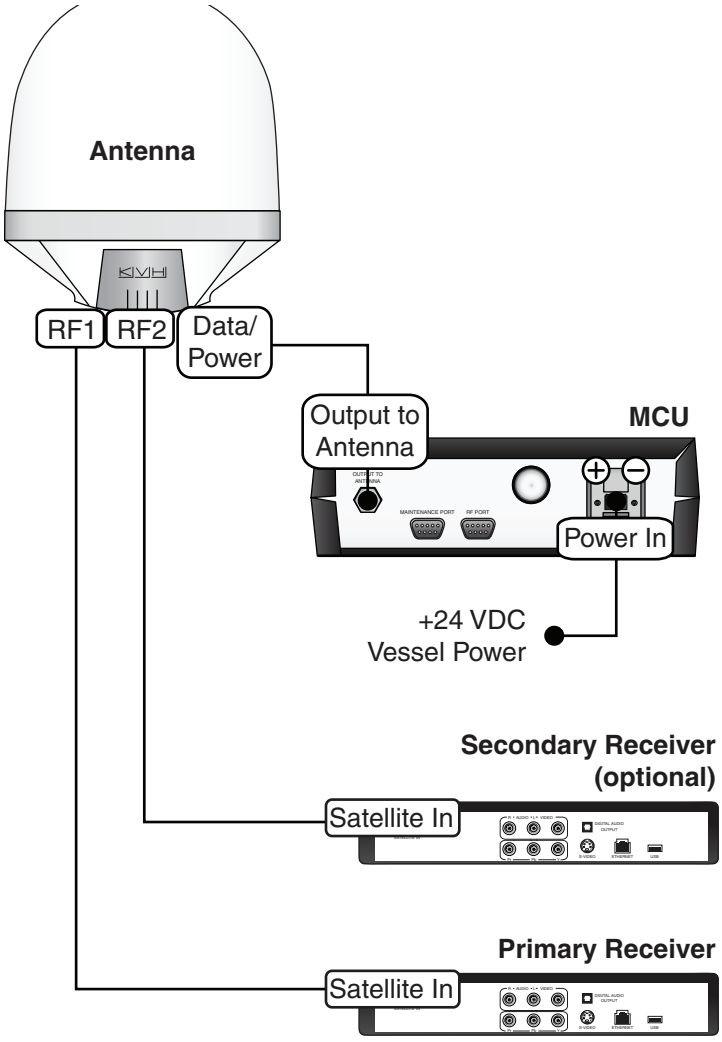
Linear Quad Version



NOTE: *This wiring diagrams includes a Terk® multiswitch (KVH Part # 19-0573).*

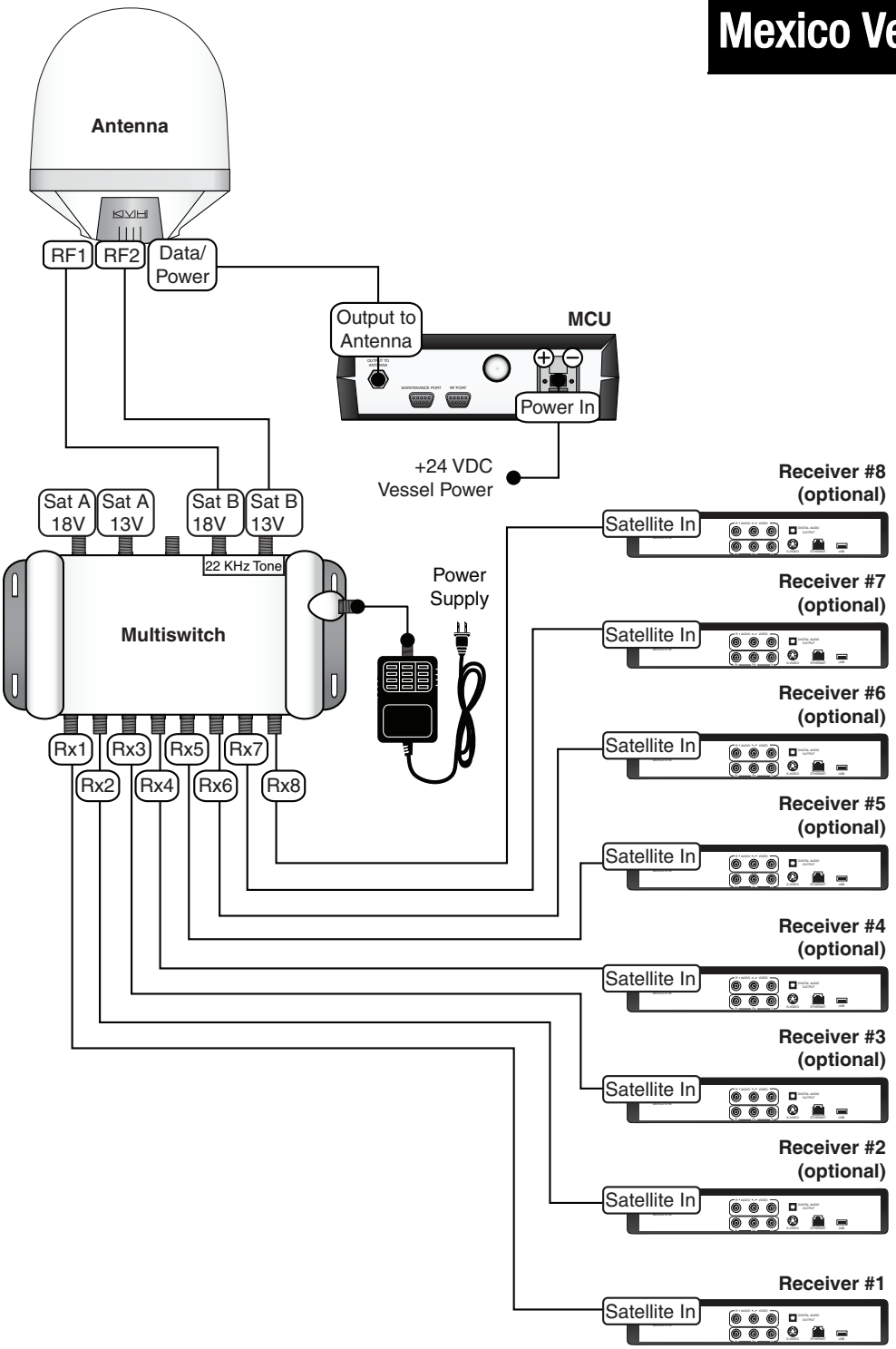
Wiring One or Two Receivers

Linear Sky Mexico Version



Wiring Up to Eight Receivers

Linear Sky Mexico Version



NOTE: *This wiring diagrams includes a Terk® multiswitch (KVH Part # 19-0573).*

Appendix D Recalibration

This appendix explains how to recalibrate the system. This information should only be utilized by KVH-authorized technicians.

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Recalibrating the System

During installation, the TracVision M9 should have been properly calibrated. However, if the antenna is moved or if additional equipment is installed or removed near the antenna, KVH recommends recalibrating the system. The following sections explain how to recalibrate the system.

NOTE: *This procedure does not apply to large vessels, such as tankers and large cargo ships.*

To perform this procedure, you will need to perform the following:

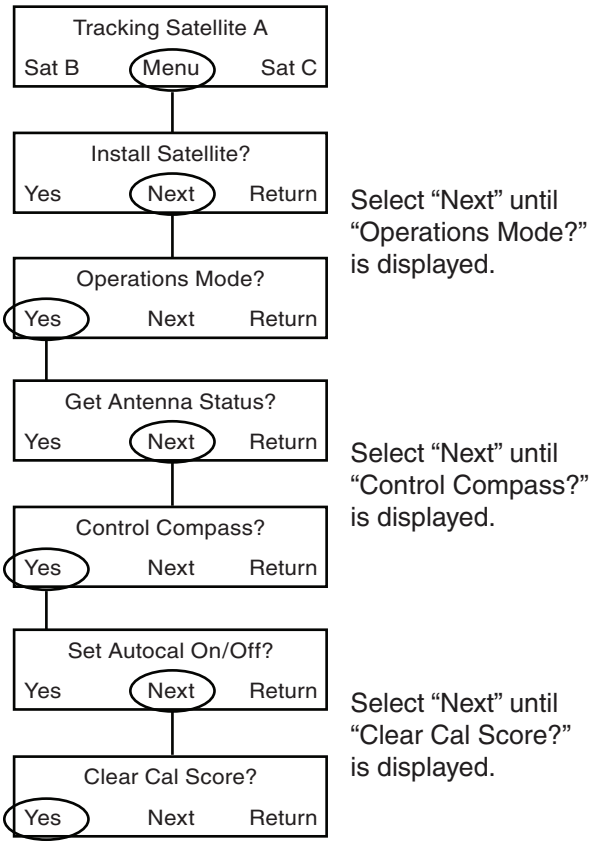
- Clear the existing calibration score
- Turn on autocalibration
- Recalibrate the system
- Verify the calibration score

Clear the Existing Calibration Score

Use the flowchart in Figure D-1 to clear the existing calibration score.

NOTE: *Be sure to turn the system off after completing this procedure. Wait 10 seconds, then turn the system on.*

Figure D-1 Clearing the Existing Calibration Score

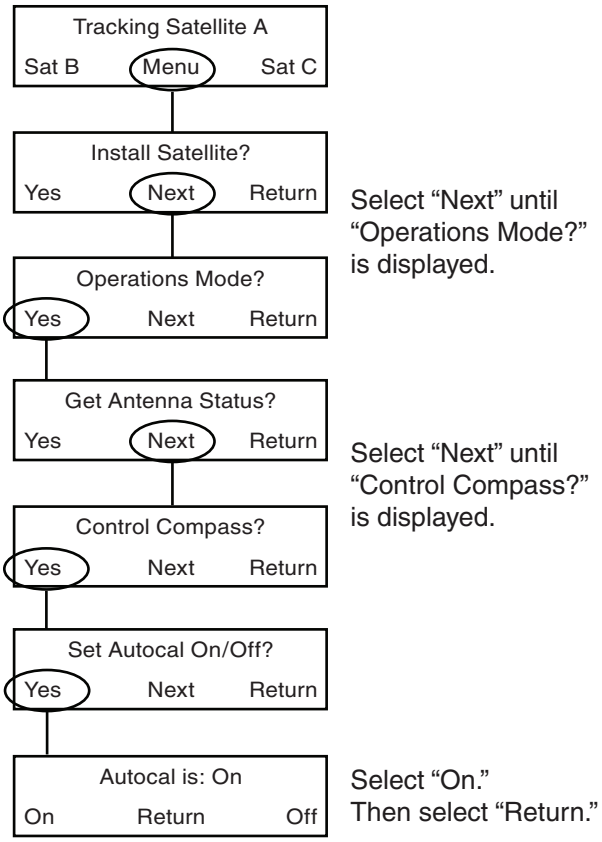


Turn On Autocalibration

Use the flowchart in Figure D-2 to turn on autocalibration.

NOTE: *Autocalibration automatically turns off after a valid calibration score is received. For more information on interpreting the calibration score, see* *"Interpreting the Calibration Score" on page 79*.

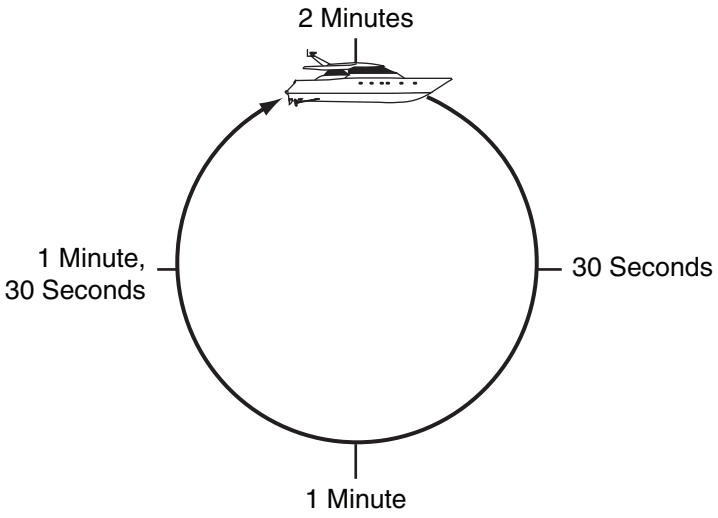
Figure D-2 Turning On Autocalibration



Recalibrate the System

1. Select a calm day and a clear area. Excessive pitching and rolling can distort calibration data.
2. Apply power to the TracVision system.
3. Write down your approximate heading. You will use this information later in this procedure.
4. Steer the vessel at a slow, steady pace through a full circle that takes at least two minutes to complete. Use the heading information that you recorded earlier to confirm that you completed a full circle (see Figure D-3).

Figure D-3 Timing the Calibration Circle

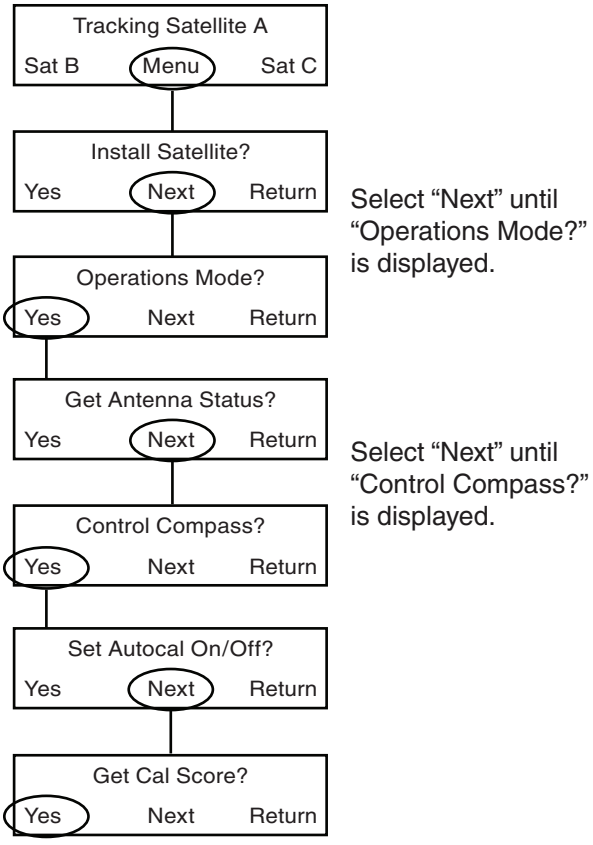


Verify the Calibration Score

This section explains how to interpret the calibration score display. Be sure to verify that the calibration yielded acceptable results. If the calibration did not yield acceptable results, you will need to restart recalibration.

Use the flowchart in Figure D-4 to display the calibration score. For information on interpreting the calibration score, see "Interpreting the Calibration Score" on page 79.

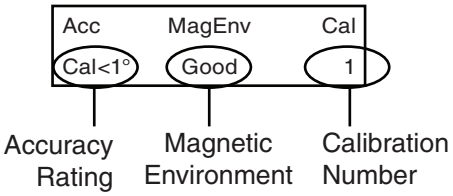
Figure D-4 Displaying the Calibration Score



Interpreting the Calibration Score

Each calibration results in a calibration score that is stored in the system's memory. The calibration score contains an accuracy rating, a magnetic environment rating, and the number of calibrations performed.

Figure D-5 Calibration Score Screen



Accuracy Rating

The accuracy rating indicates the degree of accuracy the antenna's internal sensor will provide based on the quality of the last calibration. Figure D-6 lists the five possible accuracy rating levels.

Figure D-6 Accuracy Rating Levels

Accuracy Rating	Accuracy
<1°	Better than 1°
<2°	Better than 2°
<4°	Better than 4°
<8°	Better than 8°
BAD CAL	Recalibrate

Magnetic Environment

The magnetic environment rating (GOOD, POOR, BAD) indicates the environmental quality of the installation location. If the quality is POOR or BAD, check the area around the antenna for materials that might cause magnetic interference. Relocate the materials if possible, or relocate the antenna to a more favorable magnetic environment. Then restart recalibration.

Calibration Number

The calibration number indicates the number of times the antenna's internal sensor has been calibrated. This is primarily used to verify that a new calibration has been accepted by the system.

Appendix E
Menu Options

This appendix details the MCU menu structure and available menu options.

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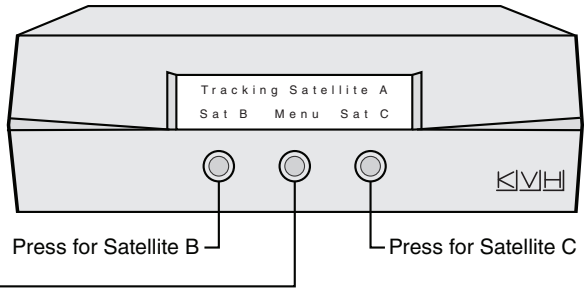
Menu Options



Install Satellite? (Yes Next Return) → Next → Set Sat Switch Type? (Yes Next Return) → Next → Restart Antenna? (Yes Next Return) → Next → Operations Mode? (Yes Next Return)

- Install Satellite? — Yes
  - Circular or Linear?
    - Circular
    - Linear
      - Trisat Mode?
        - No
          - Select Hemisphere
          - Install A Satname1
          - Select Hemisphere
          - Install B Satname2
          - Select Hemisphere
          - Install C Satname3
        - Yes
          - Install Europe WB? — *Install HBDW13E, AST19E, ASTS28E*
          - Install Europe? — *Install HBD13E, AST19E, ASTS28E*
          - Install Scandinavia? — *Install HBDW13E, SIRI5E, THOR1W*
  - Service=DIRECTV?
    - Yes
      - Mode= Dual-sat? — *Install DTV101W, DTV119W*
      - Mode= Tri-sat? — *Install DTV101W, DTV110W, DTV119W (not used)*
  - Next
  - Service=DISH?
    - Yes
      - Mode= DISH 1000/61? — *Install DSH110W, DSH119W, DSH61W*
      - Mode= DISH 1000/129? — *Install DSH110W, DSH119W, DSH129W*
      - Mode= DISH 500? — *Install DSH110W, DSH119W*
  - Service=ExpressVu? — *Install EXVU82W, EXVU91W*
  - Next
  - Service=Custom?
    - Yes
      - Select Hemisphere
      - Install A Satname1
      - Select Hemisphere
      - Install B Satname2
      - Select Hemisphere
      - Install C Satname3
- Set Sat Switch Type? — Yes
  - Sat Switch: Auto
  - Sat Switch: Manual
- Restart Antenna? — Yes
  - Antenna Restarted
- Operations Mode? — Yes
  - Get Antenna Status?
    - Yes
      - Get System Errors?
      - Get Version?
      - Get Serial Number?
      - Get Thres/Sig Level?
      - Get Skew Angle?
      - Get Bit Error Rate?
      - Get State?
    - Next
  - Control Antenna?
    - Yes
      - *Man Control Antenna?*
      - *Restart Antenna?*
      - *Set Sleep On/Off?*
      - *Set Instant On/Off?*
      - *Install Satellite?*
      - *Set Lat/Long?*
      - *Select Satellite?*
      - *Set Skew?*
      - *Set Sidelobe On/Off?*
      - *Sat Frequency Scan?*
      - *Configure Satellite?*
    - Next
  - Control Compass?
    - Yes
      - Set Autocal On/Off?
      - Get Cal Score?
      - Clear Cal Score?
    - Next
  - Set Brightness?

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